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INCREASING VARIETY OF FOODS CONSUMED BY BLENDING NONPREFERRED FOODS INTO PREFERRED FOODS

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A treatment with differential or noncontingent reinforcement and nonremoval of the spoon increased the acceptance of one or two of 16 foods for 2 participants with severe food refusal. These differential levels of acceptance were demonstrated empirically in an ABAB design in which A was the presentation of the accepted (preferred) foods and B was the presentation of foods the participants refused (nonpreferred foods). Subsequently, we implemented a blending treatment that consisted of mixing (blending) nonpreferred foods into preferred foods in various ratios (e.g., 10% nonpreferred/90% preferred, 20% nonpreferred/80% preferred). We then presented nonpreferred foods that had been exposed to blending to determine if consumption of nonpreferred foods would increase following the blending treatment. We also conducted periodic reversals in which we presented nonpreferred foods that had not been exposed to the blending treatment. Following initial implementation of the blending treatment, consumption was high for nonpreferred foods that had been blended and low for nonpreferred foods that had not been blended. Consumption increased for all foods (i.e., foods that had been exposed to blending and foods that had not been exposed to blending) after seven or eight foods had been exposed to the blending treatment. Thus, the variety of foods consumed by the participants increased from one or two to 16. These results are discussed in terms of stimulus fading, conditioned food preferences, and escape extinction.

DESCRIPTORS: conditioned food preferences, food refusal, negative reinforcement, stimulus fading

Despite the growing number of studies on consequence-based interventions for feeding problems (e.g., Ahearn, Kerwin, Eicher, Shantz, & Swearingin, 1996; Cooper et al., 1995; Hoch, Babbitt, Coe, Krell, & Hackbert, 1994; Patel, Piazza, Martinez, Volkert, & Santana, 2002; Riordan, Iwata, Finney, Wohl, & Stanley, 1984), fewer studies have been published on antecedent variables that influence feeding problems or their role in the assessment and treatment of these problems. A notable exception is a study by

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Munk and Repp (1994) in which behavioral assessments were conducted to identify the properties of food that were associated with refusal for 5 children with feeding problems. Munk and Repp identified four categories of feeding problems: food selectivity by type, food selectivity by texture, food selectivity by type and texture, and total food refusal.

Patel, Piazza, Santana, and Volkert (2002) extended the work of Munk and Repp (1994) by using the results of an assessment of type and texture to decrease the expulsion of food in a girl who demonstrated sensitivity to both the type and texture of a food item (meat). Patel et al. showed that higher texture fruits, vegetables, and starches were not expelled, and that expulsion occurred primarily with higher texture meats. The treatment consisted of lowering the texture for meats only, which resulted in decreased expulsion. Thus, the participant consumed a balanced variety of food during each meal that consisted of higher texture fruits, vegetables, and starches with lower texture meats.

Patel, Piazza, Santana, and Volkert (2002) showed that a single, rapid change in texture resulted in decreased expulsion for 1 participant. By contrast, Shore, Babbitt, Williams, Coe, and Snyder (1998) used a more gradual method of changing texture (i.e., stimulus fading) to increase the texture of foods consumed by 1 participant. Shore et al. systematically increased the amount of higher texture foods that were blended into lower texture foods by 25% increments. The method of fading (combining higher textures with lower textures) was successful in raising the texture the participant would accept from pureed foods to foods that were finely chopped.

Similarly, Patel, Piazza, Kelly, Ochsner, and Santana (2001) used stimulus fading to treat refusal of calorically dense fluids. The goal of treatment was to increase the child's acceptance of milk with Carnation Instant Breakfast® (CIB). First, CIB was blended into water (a liquid accepted readily by the child) by systematically increasing the amount of CIB in water in 10% increments. Next, milk was added to the water and CIB mixture by 10% increments, and the child then consumed milk and CIB in a typical manner.

Shore et al. (1998) and Patel et al. (2001) blended foods or liquids that were consumed readily (lower textures and water, respectively) with foods and liquids that were not consumed readily (higher textures and milk with CIB, respectively) to facilitate acceptance of the nonpreferred foods or liquids. Kern and Marder (1996) and Piazza et al. (2002) also showed that blending nonpreferred and preferred foods simultaneously enhanced acceptance of nonpreferred foods. Piazza et al. compared two methods for presenting nonpreferred and preferred foods (simultaneous and sequential) with 3 children who exhibited food selectivity. Simultaneous presentation involved pairing a nonpreferred food and a preferred food in a single presentation (e.g., a piece of nonpreferred broccoli on a preferred potato chip). During sequential presentation, consumption of the nonpreferred food resulted in access to the preferred food. Consumption increased immediately for 2 children during the simultaneous condition but not the sequential condition. Increases in consumption occurred in the simultaneous condition relative to the sequential condition for the 3rd participant, but only after physical guidance and re-presentation were added to treatment.

Piazza et al. (2002) and Kern and Marder (1996) demonstrated that simultaneous presentation was more effective than sequential presentation for increasing acceptance of nonpreferred food. Kern and Marder reported that the nonpreferred foods were presented and consumed in the absence of preferred food following a series of fading steps in which the amount of preferred food was reduced gradually. However, neither Kern and Marder nor Piazza et al. systematically

evaluated whether blending preferred and nonpreferred foods would result in increased consumption of nonpreferred foods when presented independent of preferred foods.

The purpose of the current study was to extend the work on simultaneous presentation and fading by demonstrating continued consumption of nonpreferred foods independent of preferred foods following a simultaneous presentation procedure (Kern & Marder, 1996; Piazza et al., 2002). We treated the food refusal of 2 children by combining elements of simultaneous presentation and stimulus fading. First, we demonstrated that the children would consume some foods (preferred) but not others (nonpreferred) when presented in conjunction with reinforcement and nonremoval of the spoon. Next, we blended nonpreferred foods into preferred foods in increments, which we increased gradually by 10%. We then presented nonpreferred foods that had been exposed to blending and nonpreferred foods that had not been exposed to blending to assess the effects of the blending treatment on consumption of nonpreferred foods.

METHOD

Participants and Setting

The 2 participants had been referred to a pediatric feeding disorders day-treatment program for severe food refusal. Hank was a 4-year-old boy whose medical history included complex gastrointestinal problems. Hank received 100% of his caloric needs via a nightly J-tube feeding. Al was a typically developing 3-year-old boy who refused all solid foods and received 100% of his nutritional needs via approximately seven bottle feedings each day (one at 1:00 p.m. and six between 6:00 p.m. and 7:00 a.m.).

All sessions were conducted in rooms (3 m by 2.5 m) containing tables, chairs, and other materials relevant to the sessions. One to four sessions were conducted approximately every 1 to 3 hr (e.g., 9:00 a.m., 10:30 a.m., 12:00 p.m., 3:00 p.m., and 4:00 p.m.) for a total of five to 20 sessions per day. Brief breaks (5 to 10 min) were provided between each session.

Prior to the current study, participants had been exposed to treatments for their feeding problems; these included components of differential or noncontingent reinforcement and nonremoval of the spoon (Cooper et al., 1995). Treatment was applied to four items from each of four food groups (starches, proteins, fruits, and vegetables) for a total of 16 foods identified by the parents as foods they would like their child to eat. However, the initial treatments failed to increase consumption for the majority of foods over the course of 12 and 37 sessions for Hank and Al, respectively.

We observed, however, that consumption of specific foods (applesauce for Hank and peaches and pears for Al) did increase. Therefore, we used this information to develop the blending treatment. Even though consumption of the applesauce for Hank and peaches and pears for Al increased only after implementation of the treatment package, we called these foods "preferred foods," referring to the child's relative consumption (i.e., reflecting the fact that these foods were consumed relative to the other foods, which were avoided or not consumed). The remaining foods, which the child avoided, were referred to as "nonpreferred foods." The nonpreferred foods for Hank were peaches, Egg Beaters®, fruit cocktail, mandarin oranges, mushrooms, creamed corn, broccoli, peas, tuna, rice, ravioli, French fries, macaroni and cheese, potatoes, and American cheese. The nonpreferred foods for Al were applesauce, bananas, sweet potatoes, potatoes, sweet potatoes and corn, carrots, squash, green beans, vegetable beef or turkey soup, chicken and gravy, peas, mixed vegetables, chicken noodle soup, and apples and chicken. All foods were presented

at a pureed texture (blended in a blender for Hank or from a jar for Al) based on recommendations from the consulting occupational therapist.

Response Measurement and Interobserver Agreement

Trained therapists used laptop computers to collect frequency data on acceptance and mouth clean. Data were converted to percentage of trials for acceptance and mouth clean by dividing the number of acceptances or mouth clean by the number of bite presentations within each session. *Acceptance* was defined differently for participants because Hank was a self-feeder and Al was not. Acceptance was defined as Hank placing a bite of food past the lips within 15 s of presentation (i.e., either independently or following a verbal or gestural prompt). Acceptance was defined as food being placed in the mouth past the lips within 5 s of presentation for Al. *Mouth clean* was defined as no food larger than the size of a pea in the child's mouth 30 s after acceptance, but did not include the absence of food in the mouth as a result of expulsion (spitting out the food).

Each session was partitioned into 10-s intervals for the calculation of interobserver agreement coefficients. Exact agreement coefficients were calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100%. An exact agreement was defined as both observers recording the same frequency of a target response in a given 10-s interval. Exact agreement for acceptance for Hank was recorded for each prompt (independent, verbal, and gestural), resulting in three agreement coefficients for acceptance corresponding to the point in the prompting sequence at which Hank accepted the bite.

Interobserver agreement was collected for 31% and 32% of sessions for Hank and Al, respectively. Agreement for Hank was 96% (range, 81% to 100%) for independent acceptance, 99% (range, 93% to 100%) for verbal acceptance, 100% for gestural acceptance, and 95% (range, 81% to 100%) for mouth clean. Agreement for Al was 93.4% (range, 85.7% to 100%) for acceptance and 86.7% (range, 67.7% to 100%) for mouth clean.

Experimental Design

First, we demonstrated that the participants would eat preferred foods relative to nonpreferred foods using a reversal design (ABAB) in which the A phase was presentation of preferred foods and the B phase was presentation of nonpreferred foods. Then, we used a reversal design (BCBCB) to evaluate the extent to which the child would eat nonpreferred foods prior to (B) and after (C) the blending treatment.

Assessment of Preferred and Nonpreferred Foods

During preferred-food sessions, Hank was presented with applesauce and Al was presented with peaches or pears (one food per session according to a counterbalanced schedule). During nonpreferred-food sessions, four nonpreferred foods (one from each food group) were selected randomly for presentation from the 15 (Hank) and 14 (Al) nonpreferred foods that Hank and Al had refused during the previous treatment analysis. The general procedures for food presentation are described below.

Evaluation of the Blending Treatment

The blending treatment consisted of blending nonpreferred and preferred foods together and then gradually increasing the ratio of nonpreferred to preferred food. We then presented the previously blended food alone. We evaluate the effects of the blending treatment by presenting the child with the foods that had been blended (postblending sessions), and then presenting the child

with foods that had not been blended (nonpreferred-food sessions) using a reversal design. This procedure was similar to the one used by Piazza, Hanley, and Fisher (1996) in which multiple training sessions were conducted; these were followed by test sessions to evaluate the effects of training.

Blending treatment. During blending sessions, nonpreferred foods were blended into the preferred foods (applesauce for Hank and peaches or pears for Al). Initial blending ratios (i.e., the ratio between the nonpreferred and preferred foods used in blending sessions) were based on responding in a previous assessment that used reinforcement and nonremoval of the spoon as treatment. Initial blends of nonpreferred foods were 40% for Egg Beaters® and peaches (e.g., 40% Egg Beaters®/60% applesauce) and 10% for all other foods for Hank (e.g., 10% mushrooms/90% applesauce) and 70% for applesauce and 10% for all other foods for Al.

Each blend (e.g., chicken and applesauce) was presented individually in consecutive sessions. The specific combination of nonpreferred and preferred foods was mixed in a blender or poured into a measuring cup and stirred with a spoon. If the percentages of acceptance and mouth clean were both above 75% for three consecutive sessions for the blend, we presented the nonpreferred food alone (e.g., chicken) to determine if further blending was necessary. If acceptance and mouth clean were not above 75% within six sessions for the blend, the single food was not presented alone (i.e., if the child failed to eat the blend, then it was not likely that he would eat the single food alone), and the ratio of nonpreferred to preferred food was decreased (e.g., from 20/80 to 10/90).

If percentages of acceptance and mouth clean were both above 75% for three consecutive sessions for the nonpreferred food alone, we conducted postblending sessions to evaluate the effectiveness of the blending treatment (see below). If acceptance and mouth clean were not above 75% within six sessions for the nonpreferred food alone, we continued the blending procedure by increasing the ratio of nonpreferred to preferred food (e.g., from 10/90 to 20/80).

Assessment of the effectiveness of the blending treatment (postblending sessions). The postblending sessions demonstrated that the child would eat the nonpreferred foods (presented in the absence of preferred foods) following the blending treatment. As described above, the postblending sessions were conducted once acceptance and mouth clean were above 75% for a single nonpreferred food that had been exposed to the blending treatment. Early in the blending treatment (i.e., when only two to four food items had been exposed to the blending treatment), each of those food items was presented in a postblending session. When five or more food items had been exposed to the blending treatment, one food item from each of the four food groups was selected randomly and presented during a postblending session. These sessions were identical to the initial presentation of nonpreferred foods, with the exception that only foods that had been blended previously were presented. When acceptance and mouth clean were both above 75% during the postblending sessions, a brief reversal was conducted to evaluate the extent to which the child would eat the nonpreferred foods that had not been blended.

Nonpreferred-food sessions. This phase was identical to the initial nonpreferred-food phase, with the exception that only the foods that had not been blended yet were presented. That is, four nonpreferred foods, one from each of the four food groups, that had not been blended were selected randomly and presented during the session. The food items were selected randomly so that the reversal sessions would be identical to the initial nonpreferred-food phase. If acceptance and mouth clean were not above 75% dur-

ing the reversal session, then the blending treatment continued as described above.

If acceptance and mouth clean were above 75% during the reversal, we then presented all the foods (both those that had been blended and those that had not been blended). This was the terminal goal of the study (for the children to consume all of the previously nonpreferred foods in the absence of the preferred foods).

The order in which nonpreferred food items were exposed to the blending treatment were peaches, Egg Beaters®, fruit cocktail, mandarin oranges, mushrooms, creamed corn, broccoli, and peas for Hank; and applesauce, bananas, sweet potatoes, potatoes, sweet potatoes and corn, carrots, and squash for Al. Blending was unnecessary for tuna, rice, ravioli, French fries, macaroni and cheese, potatoes, and American cheese for Hank. Al did not require blending for green beans, vegetable beef or turkey soup, chicken and gravy, peas, mixed vegetables, chicken noodle soup, and apples and chicken.

General Procedure

Differential (Hank) or noncontingent (Al) reinforcement and nonremoval of the spoon were in place prior to the current analysis. Therefore, these procedures continued throughout the analysis.

Level spoons of food were placed on a plate in front of Hank or 2.5 cm from Al's lips, and the child was prompted verbally to take a bite approximately once every 30 s. Sequential verbal (i.e., "Hank, take a bite"), gestural, and physical prompts were delivered in 5-s intervals if Hank did not accept the bite independently within 5 s of presentation. Acceptance resulted in brief praise (i.e., "good job") for both children. If Hank refused to open his mouth during physical guidance or Al refused the bite 5 s after presentation, the spoon remained at the child's lips until the bite was accepted (nonremoval of the spoon; Cooper et al., 1995). Verbal praise and preferred stimuli were presented for 30 s following a mouth clean for Hank. Al had continuous access to preferred stimuli and verbal attention provided by the therapist during the sessions. Expelled bites were re-presented, and emesis was ignored. The last bite of food was presented at 5 min into the session, and the session ended when that bite was consumed (i.e., mouth clean). If that last bite was not consumed, the session continued until a preset time limit was reached (2 hr for Hank during the initial ABAB phases and 1 hr during the blending treatment; 10 min for Al). The time limit for Hank was reduced to 1 hr during the blending treatment because within-session analysis of data suggested no differences in session outcome beyond 1 hr. Thus, we were able to conduct more sessions using the 1-hr time limit.

Mean session lengths for Hank and Al were 5.1 and 4.9 min, respectively, for preferred foods during the assessment of preferred and nonpreferred foods, 94.5 and 9 min, respectively, for nonpreferred foods during the assessment of preferred and nonpreferred foods, 6.2 and 5.4 min, respectively, for the blending treatment, 5.2 and 5 min, respectively, for postblending sessions, and 13.1 and 5.9 min, respectively, for nonpreferred-food (reversal) sessions.

Follow-Up

Data were collected during both clinic-based outpatient and in-home sessions. Although the foods presented in the follow-up sessions were the same variety as described above, procedural changes were implemented to advance each child's feeding skills to a more typical eating pattern. Parents fed all meals in follow-up. Hank's food texture was increased gradually, and the 1-month probe was conducted with chopped texture in Hank's home. The 2-month probe was collected using chopped food during a clinic-based outpatient visit. For 3-, 4-, 5-, and 6-

month probes, chewing with chopped foods chosen from the original variety was targeted. Al's food texture was raised gradually from 100% puree to 75% puree/25% wet ground during the first 2 months. At a 5-month probe, the latency for checking for a mouth clean was decreased from 30 s to 20 s. At 6 and 7 months, the texture of Al's food was increased again to 50% wet ground/50% chopped.

RESULTS

Figure 1 depicts Hank's results for acceptance and mouth clean. The percentage of trials with acceptance was higher with preferred than with nonpreferred foods. Levels of acceptance increased immediately during postblending sessions. By contrast, levels of acceptance during the nonpreferred-food reversal sessions remained more variable for the first six sessions and then increased to 100% for all but one of the remaining sessions. Levels of mouth clean were 100% for preferred foods and were more variable and generally lower for nonpreferred foods. Levels of mouth clean increased immediately to above 80% during the postblending sessions. Levels of mouth clean for the nonpreferred-food reversal sessions were low for the first four reversals and then began increasing gradually.

Figure 2 depicts Al's results for acceptance and mouth clean. The percentage of trials with acceptance was higher with preferred than with nonpreferred foods. Levels of acceptance increased immediately during postblending sessions. By contrast, levels of acceptance during the nonpreferred-food reversal sessions remained more variable for the first six sessions and then increased to 100%. Levels of mouth clean were near 100% for preferred foods and 0% for nonpreferred foods during the initial ABAB phases. Levels of mouth clean increased immediately during the postblending sessions. Levels of mouth clean for the nonpreferred-food reversal sessions were low for the first six reversals and then increased to 100%.

DISCUSSION

We increased the number and type of foods consumed for both participants by blending incrementally larger amounts of nonpreferred foods into preferred foods. These results replicate those of Piazza et al. (2002) and Kern and Marder (1996) by showing that simultaneous presentation of nonpreferred and preferred foods may facilitate acceptance. In addition, we extended the work of Piazza et al. and Kern and Marder by demonstrating that the participants would consume the nonpreferred foods independent of the preferred foods following the blending procedure. Hank and Al began consuming 15 and 14 previously nonpreferred foods, respectively, so that they ended the study eating four foods from each of four food groups.

There are several possible explanations why blending or simultaneous presentation of preferred and nonpreferred food may facilitate acceptance. First, the presence of the preferred food may act as an abolishing operation (Laraway, Snycerski, Michael, & Poling, 2003; Michael, 1982, 1993) to reduce the aversiveness of the nonpreferred food (Piazza et al., 2002). Presumably, feeding problems are maintained by negative reinforcement in the form of escape from eating (e.g., Ahearn et al., 1996; Cooper et al., 1995; Hoch et al., 1994; Piazza et al., 2003). In this case, the putative aversive stimulus is the nonpreferred food. It is not clear which characteristics (e.g., flavor, texture, smell, color) of nonpreferred food are aversive to individuals with food refusal. Nevertheless, both participants in the current investigation avoided the nonpreferred food prior to the blending treatment, but consumed the nonpreferred food following blending. There-

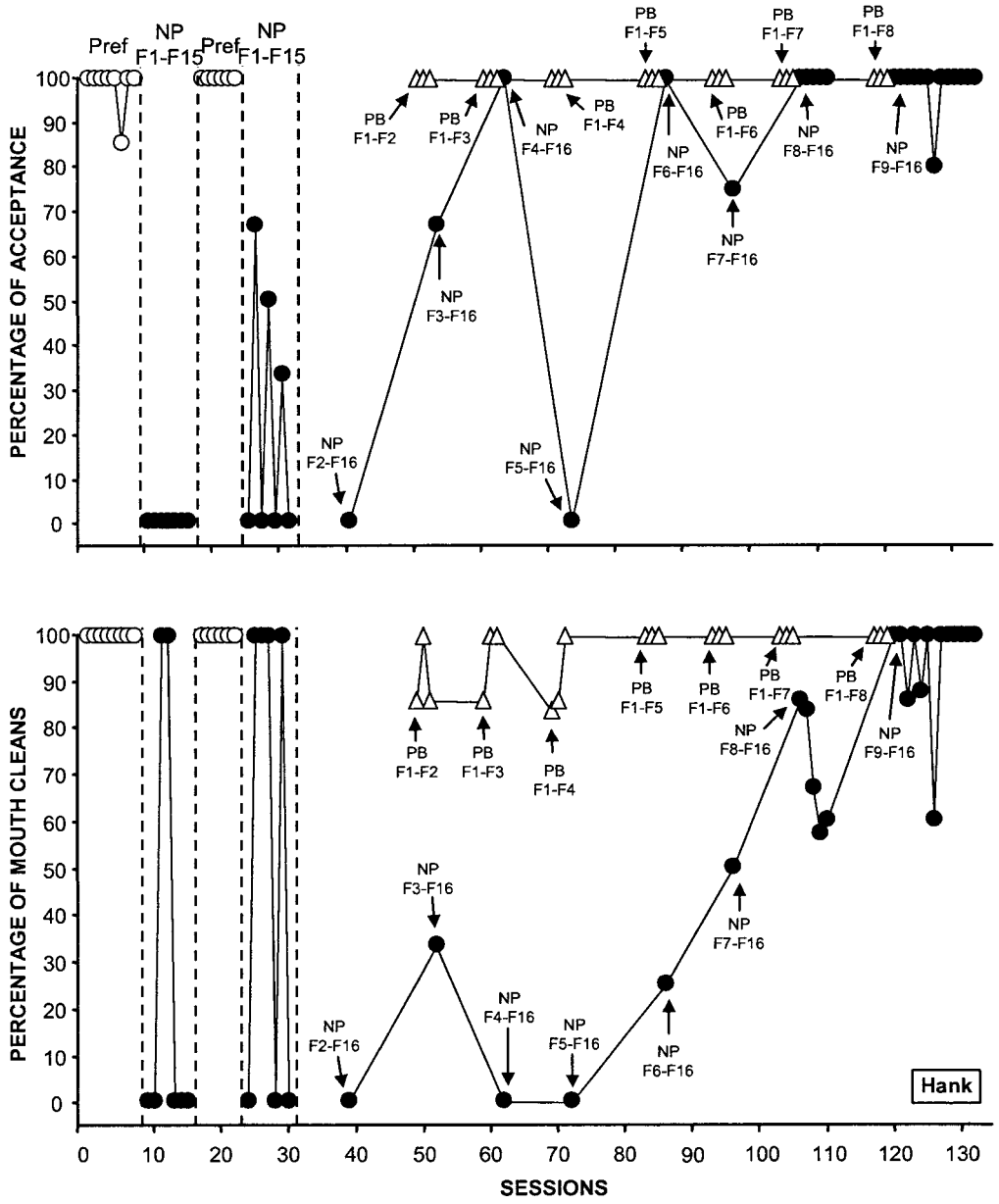

Figure 1. Percentage of acceptance (top panel) and mouth clean (bottom panel) during the assessment of preferred (Pref) and nonpreferred (NP) foods and during assessment of postblending (PB) and nonpreferred-food (NP) sessions for Hank. The label "F" refers to food, and the numbers refer to which foods were included in the session (e.g., F1 refers to Nonpreferred Food 1, F1–F15 refers to all 15 nonpreferred foods included in the session).

fore, the presence of the preferred food in combination with the nonpreferred food may have altered the effectiveness of escape as reinforcement.

Alternatively, blending or simultaneous presentation may facilitate acceptance of nonpreferred food through flavor–flavor conditioning (Capaldi, 1996). Studies on

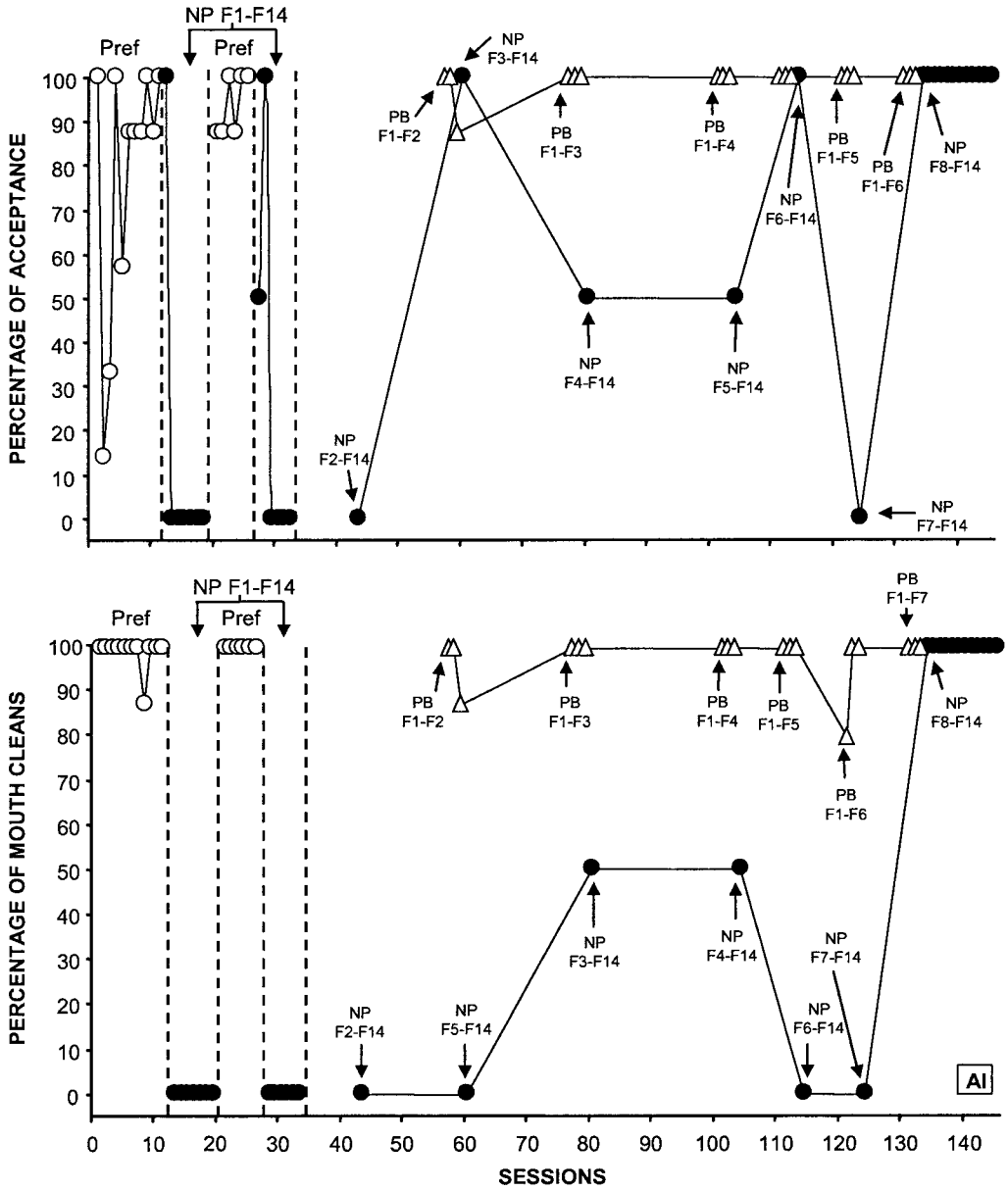

Figure 2. Percentage of acceptance (top panel) and mouth clean (bottom panel) during the assessment of preferred (Pref) and nonpreferred (NP) foods and during assessment of postblending (PB) and nonpreferred-food (NP) sessions for Al.

flavor–flavor conditioning with both humans and animals have shown that when a previously novel flavor is paired with a preferred flavor, preference of the novel flavor increases when it is later presented alone. For example, Zellner, Rozin, Aron, and Kulish (1983) presented different flavors of sweetened and unsweetened teas to college students. Subsequently, the teas were presented alone (without the sweetener), and the students preferred the teas that had been mixed previously with the sweetener. Similarly, in

the current investigation, participants who had avoided nonpreferred foods continued to eat the nonpreferred foods after these foods had been mixed with preferred foods.

In many studies on flavor–flavor conditioning, the preferred substance is sweet (e.g., saccharine). Sweetening food may facilitate flavor–flavor conditioning because humans demonstrate a preference for sweet-tasting foods that is evident from birth (Capaldi, 1996). In the current investigation, the foods preferred by the participants were sweet (applesauce for Hank and peaches and pears for Al), which may have increased the likelihood that flavor–flavor conditioning occurred. However, even though flavor–flavor conditioning may explain continued consumption of nonpreferred foods that have been paired previously with preferred foods, Hank and Al began eating some foods (eight and seven foods, respectively) that had not been paired with preferred foods.

Increased consumption of nonpreferred foods in the absence of blending with preferred foods may have occurred as a result of mere exposure. A number of studies have demonstrated that repeatedly exposing children to tastes of novel food increases preference for those foods (e.g., Birch & Marlin, 1982; Birch, McPhee, Shoba, Pirok, & Steinberg, 1987). Thus, it is possible that having the participants repeatedly taste the nonpreferred foods resulted in increased consumption independent of the blending procedures. Recall, however, that the participants had been exposed to the nonpreferred foods in conjunction with other unsuccessful treatments that were used prior to and during the current investigation.

Nevertheless, levels of acceptance and mouth clean increased in the absence of blending for some foods, which may indicate that the blending procedure was not responsible for the increases in consumption of foods that had been blended. However, the data for the 2 participants are remarkably similar in that acceptance and mouth clean for nonblended foods increased at about the same place in fading (i.e., after seven and eight foods were blended). These data also are consistent with those of Patel et al. (2001), who used a similar blending method in which water and subsequently milk were blended into CIB. The participant began to consume the water mixed with CIB and the milk mixed with CIB prior to completion of all fading steps and at the same place in the fading procedure (when the concentrations were at 30%). Taken together, these two studies suggest that all fading steps may not be necessary when using blending procedures.

One potential limitation of the current investigation is that a treatment package consisting of reinforcement and nonremoval of the spoon was used to increase consumption of the preferred foods initially. Thus, it is reasonable to question the extent to which the participant preferred these foods, because the foods were not consumed in the absence of reinforcement and nonremoval of the spoon. We use the term *preferred food* in a relative way to indicate that these foods were more preferred by the participants than the nonpreferred foods. Recall, however, that reinforcement and nonremoval of the spoon were not effective for increasing consumption of the other 15 (Hank) or 14 (Al) foods that also were exposed to reinforcement and nonremoval of the spoon. Thus, from a hierarchical standpoint, the consumed foods were preferred (under treatment contingencies) relative to the foods that were not consumed. Information about the participants' relative consumption during reinforcement and nonremoval of the spoon was used to develop the blending treatment.

A second limitation of the current investigation is that the blending procedures were combined with reinforcement and nonremoval of the spoon for both participants. It is possible that treatment effects were a func-

tion of reinforcement and nonremoval of the spoon alone. This explanation seems unlikely, because this treatment was in place prior to the start of the current investigation for 12 and 37 sessions for Hank and Al, respectively, during the assessment of nonpreferred and preferred foods and during six nonpreferred-food reversal sessions for Hank and Al. Nevertheless, consumption of nonpreferred foods did not increase during the previous unsuccessful treatment or during the assessment of nonpreferred and preferred foods for either participant. During the blending procedure, levels of consumption decreased when nonpreferred foods that had not been blended were presented during six reversal sessions for Hank and Al. If the changes in consumption were due to repeated exposure to reinforcement and nonremoval of the spoon, then changes in both blended and nonpreferred conditions should have occurred at approximately the same time; this did not happen. However, it is not possible to determine from these data whether blending without reinforcement and nonremoval of the spoon would have produced similar results, and this question should be the focus of future research.

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STUDY QUESTIONS

1. What was the purpose of the initial ABAB analysis of preferred versus nonpreferred foods?

2. What were the contingencies for appropriate eating and food refusal?

3. Describe the blending procedure and the way in which it was implemented.

4. What was the purpose of the postblending sessions, and how were they conducted?

5. Describe the general results obtained in the postblending and nonpreferred-food reversal sessions for both participants.

6. The authors suggested that flavor–flavor conditioning may have accounted for observed increases in the consumption of nonpreferred foods during postblending sessions. How might one demonstrate the effects of flavor–flavor conditioning?

7. What design would allow experimenters to test for the effects of mere exposure on performances such as those examined in this study?

8. Blending treatments have been described as antecedent interventions. In what way might blending also involve a contingency manipulation?

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